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and to indicate a new species for which I would propose the name *Crocodilus Floridanus*, or Florida Crocodile.

We present, for general illustration, a cut of the skull of an *Alligator Mississippensis* (Fig. 215) compared with the skull of a crocodile (Fig. 214). Both are from the same locality, Biscayne, Florida. The length of the alligator to which this skull belonged was nine feet ten inches, and that of the crocodile was ten feet eight inches, the figure being taken from the skull of the female here described.

I append the following measurements, in inches, of the three largest crocodile skulls. The first is that of the male 14 feet in length; the second that of the female 10 feet 8 inches in length; and the third, that of the Lake Worth specimen, 9 feet 10 inches in length.

Extreme length of head, ...	31½	21½	22
Length of skull from occiput, ...	24¾	18	18
Greatest width behind, ...	14½	9½	10
Width of forehead before, ...	5½	4	4
" " " behind, ...	7	4½	4¾
Breadth at notch, ...	4½	3	3
" " 10th tooth, following curve, . .	12½	7⅜	7¾
" " 14th " " " .	13	8	9
Number of teeth above.	18	18	19
" " " below.	15	15	15

REVIEWS AND BOOK NOTICES.

Geographical Variation in Color among Squirrels.—We have previously, in papers by Messrs. R. Ridgway and J. A. Allen, presented our readers with the latest views on the subject of the geographical variation in size, proportions and color among North American birds, and now reproduce in part a recent paper by Mr. J. A. Allen on the same subject, particularly variations in color as applied to the squirrels of America north of Mexico, published in the "Proceedings of the Boston Society of Natural History" (vol. xvi, Feb. 4, 1874). This is a subject to which local collectors can very largely contribute by the transmission of marked varieties or specimens possessing any peculiarities in size, proportions or color to the Museum of Comparative Zoology at Cambridge or to the Smithsonian Institution, where they can be studied to the best advantage, as large numbers of the commonest species are indispensable in studying the variation of animals. Regarding color variations we quote the following remarks:

"First, in respect to the increase in intensity of color from the north southward. Among the squirrels this increase is finely illustrated in *Sciurus Hudsonius* and in *Tamias striatus*, representatives of which from the southern parts of New York and Pennsylvania are much more highly colored than are those from northern New England and the British Provinces. *Sciurus Carolinensis* is perhaps a still more marked example, in which the color varies from the light pure gray of the upper parts in New England specimens, with a restricted pale yellowish brown dorsal area, to the rusty gray dorsal surface of the Florida type, in which the whole upper surface is usually strongly yellowish-rusty. This increase of color southward is, however, still more strongly marked in the fox squirrels of the Mississippi Basin, the so-called *Sciurus* "*ludovicianus*."

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"The variations in color occurring in representatives of the same species at localities differing in longitude, is well shown in quite a number of groups. But few specific forms, however, have a sufficiently wide range to illustrate the variations that obtain along a given parallel throughout the whole breadth of the continent, the *Sciurus Hudsonius* group being the only instance among the squirrels. Others, however, show the transition that obtains in passing from the moist, fertile prairies of the Mississippi Valley to the dry plains, or from the deserts and mountainous districts of the interior to the moist region bordering the Pacific coast north of the parallel of 40°. *Spermophilus tridecem-lineatus* furnishes a good illustration of the differences in color that occur between representatives of the same species living on the moist, fertile prairies and those inhabiting the dry, barren plains, those from Illinois, Wisconsin, Minnesota and Iowa being much darker than those from Western Nebraska, Western Kansas and Colorado. Even specimens from Eastern Kansas are much darker than those from the middle and western portions of the same State. In this species the color is varied, in passing from the prairies to the plains, not only by the lighter shade of the dark ground color, but by the considerably greater breadth of the light spots and stripes in the specimens from the plains."

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"But two of the most instructive and interesting groups of the *Sciuridæ*, in this connection, are those of which the common *Sciurus Hudsonius*, and *Tamias quadrivittatus* are respectively familiar examples, the former ranging over the northern half of the continent, and the latter extending over the western half of North America and Eastern Asia. In the *Sciurus Hudsonius* group, we have at the east the well-known chickaree (*S. Hudsonius*), extending westward to the Plains, and northwestward to Alaska, with its brighter and smaller southern form in the eastern Atlantic States. On the arid plains of the Platte and Upper Missouri rivers it presents a markedly paler or more fulvous phase, well illustrated by specimens from the Black Hills. This form becomes even still paler and more fulvous at the eastern base of the main chain of the Rocky Mountains, between latitude 43° and 47°, where it begins to pass by insensible stages of gradation into the so-called *Sciurus Richardsoni* of the Rocky Mountains north of 45°, and the so-called *Sciurus Fremonti* of the Rocky Mountains south of about the same parallel. In the collections made in Western Wyoming, near the Yellowstone Lake, occur many specimens which are so exactly intermediate between the three forms (*S. Hudsonius*, *S. Richardsoni* and *S. Fremonti*) whose habitats here meet, that it is impossible to say which of the three forms they most resemble. At the same time specimens can be selected which will form a series of minute gradations from the pale form of *Hudsonius* from the Plains, on the one hand, to the *Richardsoni* and *Fremonti* forms on the other. To the southward of this district we soon pass into the region of the typical *Fremonti*, and to the westward and northward into the habitat of the *Richardsoni* type. Even the country about the sources of the Gros Ventres Fork of the Snake River, is already within the range of the true *Richardsoni*. The habitat of *S. Richardsoni* extends from the main chain of the Rocky Mountains, north of latitude 44°, to the Cascade Range. Here it becomes mixed with *S. Douglassi*, which scarcely differs from *S. Richardsoni*, except in being a little darker above, and in having the ventral surface more or less strongly tinged with buff, varying in different specimens from cinereous to pure buff. This form prevails from the Cascade Range to the Pacific Coast, southward to Northern California, and northward probably to Sitka. In Northern California the *S. Douglassi* meets the range of the true *S. Fremonti*, between which two forms there is here the most gradual and intimate intergradation. In this group we have hence four forms which, in their extreme phases of mutual divergence, appear as diverse as four good, congeneric species need to, but which, at points where their respective habitats join, pass into each other as gradually as do the physical conditions of the localities at which their extreme phases are developed.

The *Tamias quadrivittatus* group[1] presents an equally or even more striking range of variation in color, and also varies to an unusual degree in size. Beginning at the northward, we find that specimens from as far south as Pembina, and thence northward, are quite undistinguishable from specimens from Northeastern Asia, or the so-called *Tamias* "*Pallasi*" (*T. Pallasi* Baird=*T. striatus* of most European authors). This form is found to only a limited extent south of the northern boundary of the United

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[1] *Tamias quadrivittatus, T. Pallasi, T. Townsendi* and *T. dorsalis* of American authors.

States, where on the plains of the Upper Missouri it passes into the blanched, pallid form of *T. quadrivittatus* (*T. quadrivittatus* var. *pallidus* nobis,—see beyond), and farther westward into the true *T. quadrivittatus* of the Rocky Mountains, and still further westward into the so-called *T. Townsendi* of the Pacific Coast. In this group the greatest pallor is reached on the plains of the Yellowstone, and in the deserts of Nevada, Utah and Arizona. In the central portions of the Rocky Mountains (Colorado and portions of New Mexico) a form is developed distinguished by its generally bright, strong colors, but especially for the rich fulvous tints of the sides of the body, to which there is but a slight tendency either in the northern form or the pallid form of the plains. Both, however, very gradually pass into the rufous-sided type, the pallid form wherever the plains approach the mountains (as along the eastern base of the Rocky Mountains, the Uintah, Sierra Nevada, and others of the more southern ranges), gradually becoming fulvous, while the darker northern form grades into the larger fulvous race of the more northern portions of the Rocky Mountains in Montana and Idaho. This larger fulvous race west of the main divide soon begins to assume a duller, more fuscous shade, deepening finally into the very fuscous form (*T. Townsendi*) of the region between the Cascade Range and the Pacific Coast. In this form the general color increases so much in depth as to become dusky yellowish-brown, and both the light and the dark stripes become obscure, and occasionally almost entirely obsolete, through the gradual accession of color. Between the extreme phase of this fuscous type and the extreme phase of the pallid type of the plains, in which the stripes are sometimes again partially obsolete through the extreme lightness of the general color, the differences are very great indeed. Yet in placing the scores of specimens I have had the opportunity of examining in a geographical series, or arranging them simply according to their localities, a most thorough and minute intergradation becomes at once apparent. The difference in size, too, between northern and southern specimens is also unusually great; the pale, southern form of the plains, and the extremely bright, fulvous form of Colorado and New Mexico, being very much smaller than the northern, darker form, or than the fuscous type of the northwest coast.

As corroborative evidence that these varied types of coloration are but geographical races, it becomes interesting to observe that the light and dark and the fulvous and rufous forms respectively, of the different species, occur over the same areas. With the fuscous type of *Tamias quadrivittatus* occur the dark types of *Sciurus Hudsonius*, and the dark-backed form of *Spermophilus grammurus*, and also a peculiar, dusky form of Arctomys and of Lepus, and a dark form of *Spermophilus Richardsoni*. On the plains occur pallid forms of *Sciurus "ludovicanus," Sciurus Hudsonius*, *Tamias quadrivittatus*, and *Spermophilus Richardsoni*.

With the fulvous type of *Tamias quadrivittatus* occurs a rufous of *Spermophilus grammurus;* but the form of *Sciurus Hudsonius* occurring over the same area, presents the exceptional condition of a minimum amount of rufous."

Respecting the mammals and birds of the continent as a whole, Mr. Allen recognizes at least five more or less well marked areas characterized by certain peculiarities of color variation, and finds a striking correlation between these areas and the prevalent tendencies of color-increase and the amount of aqueous precipitation:

> "The first region we propose now to define is that of the Atlantic Slope, which will include not only the country east of the Alleghanies, but a large part of the British Possessions, extending westward at least as far as Fort Simpson, and thence northward and westward to Alaska, including, apparently, all of that territory north of the Alaska Mountains, with an annual rainfall throughout the whole of this extended region of about thirty-five to forty-five inches. Over this region (to which we may give the general term of *Atlantic Region*) the colors may be regarded as of the average or normal type, those of other regions being either of a diminished or increased intensity.
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> The second region will embrace the Mississippi Valley, or more properly the Mississippi Basin, and may hence be termed the *Mississippi Region.* Here the annual rainfall reaches forty-five to fifty-five inches, and over a small area east of the Lower Mississippi even exceeds sixty inches. The tendency here is so often to an increase of fulvous and rufous tints, that we may regard this as the distinctive chromatic peculiarity of the region, these tints reaching their maximum in the limited area of greatest humidity, but a general increase in intensity of color is also more or less characteristic of the region. A third region embraces the central portion of the Rocky Mountains, and being developed most strongly within the present territory of Colorado, and being also mainly included within that territory, may be termed the *Colorado Region.* The tendency here again, as compared with the immediately adjoining districts, is to a general increase of intensity of color, with also a marked inclination to the development of rufous and fulvous tints, this region being also within the influence of a comparatively high temperature, at least in summer. The humidity is here less than in either of the other regions already defined, the annual aqueous precipitation amounting to only about twenty-four to thirty inches; but it is yet greatly in excess of that of the districts immediately surrounding it.
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> The fourth region may be regarded as made up of the arid plains and deserts of the great central plateau of the Continent, including not only the "Great Plains," usually so called, but the

deserts and plains of Utah, Nevada, Western Colorado, New Mexico, Arizona and southwestward to Lower California, and may hence be appropriately termed the *Campestrian Region*. The annual rainfall is generally below fifteen inches, but ranges, at different localities, from three inches to twenty. Here a general paleness of color is the distinctive feature. The fifth region begins on the Pacific Coast at about the 40th parallel, embracing a comparatively narrow belt along the coast from Northern California to Sitka. Its peculiarities are most strongly developed west of the Cascade Range, north of 45°; they also prevail eastward nearly or quite to the main chain of the Rocky Mountains. It may hence be termed the *Columbian Region*. With an average annual rainfall of fifty-five to sixty-five inches, the prevalent tendency in color is to dusky and fuscous rather than rufous tints. The district between the Cascade Range and the main chain of the Rocky Mountains presents features that may almost entitle it to rank as a distinct region, as might also the region of maximum rainfall in the Mississippi Region. The southern half of Florida is also perhaps entitled to recognition as a distinct region, being characterized by excessive humidity and a subtropical intensity of color. It may also be necessary eventually to recognize as distinct districts the almost rainless portions of the Campestrian Region."

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After looking at the subject in this broad way the reader need not feel surprised at the suppression of a good many nominal species. In 1857 Professor Baird reduced the number of species of Sciurus from twenty-four to ten, with two doubtful ones; Mr. Allen now reduces them to *five*, with seven geographical varieties in addition. The number of North American species of Sciuridæ in all is twenty-five.

BOTANY.

THE STARCH OF ZAMIA.—The roots of *Zamia pumila* yield a large per cent. of starch. The plant grows abundantly at the head of Biscayne Bay, Florida. I also found it, though not abundantly, at New Smyrna and Cedar Keys, Florida. The soil at the head of Biscayne Bay is full of loose pieces of limy rocks; between the interstices of these the plant grows; this kind of soil suits it best. The leaves have the general appearance of ferns; its roots are rough, of a gray color, and of the shape and size of parsnips. Not only is it abundantly reproduced from seed, but any piece left in the ground grows. It could be cultivated and made profitable.